



Brilliant

Brilliant b

**Short Operating procedure for
Daily operation
and
Single shot operation**

Note: This procedure does not replace the manual. It is a short version of the different chapters and should be used as a reminder. The lecture and knowledge of the manual is mandatory before using this procedure notice.

I) Start-up and Shutdown Procedure

a) Daily Start-up

Make sure that the system is prepared as per chapter II-2 of Brilliant Manual issue# 5, January 2002. This considers especially water and power requirements.

To start the laser system, please proceed as follows:

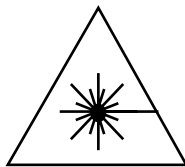
- Turn the control key on the front panel of the PCC to the “I” position, the “**power**” and the “**interlock**” indicators on the RC must light up (otherwise check for defaults on the RC screen - see chapter VI).
- Wait about 10-15 min until the water temperature reach the preset value for flashlamp operation.
- Press the **ready button** of the **flashlamp**, its LED indicator and the LASER ON indicators on the RC and on the front panel of the PCC must light up.
- Select the operation mode (user manual Chapter IV): **internal** or **external** for Flashlamp and Q-Switch using the display on RC (see this procedure § V - annexe 2, or user manual Chapter III). The standard configuration is **internal**.
- In **external** mode, follow the procedures of section IV - 1 of the User manual to select your choice, connect your cables to the laser inputs, and follow the procedure below:
- Push the **ready button** of the **flashlamp**, then the **start button** of the **flashlamp** and finally the **start button** of the **Q-Switch** will enable external operation as configured.
- Open the beam shutter of the laser, its warning LED lights up.
- Wait about 8 seconds before the Q-Switch control electronics enable normal operation of the laser. You may wait some minutes if the water temperature of the laser is below the preset value for Q-Switching operation.

The laser will start to lase when receiving an external TTL signal.

- In **internal** mode, follow the procedure below:

- Press the **start button** of the **flashlamp**, its light indicator must light up and the flashlamps operate at the fixed frequency. In external mode the flashlamp will flashes when the external signal is supplied.
- Open the beam shutter of the laser, its warning LED lights up.
- Wait about 8 seconds before the Q-Switch control electronics enable normal operation of the laser. You may wait some minutes if the water temperature of the laser is below the preset value for Q-Switching operation.

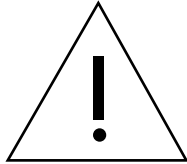
The next step allows the laser to operate and a laser beam will be emitted from the output aperture.



- Press the **start button** to activate the **Q-Switch**, and its light indicator flashes. In external mode the Q-Switch will fire when the external signal is supplied.
- If HG crystals are used, a warm up time of 20 minutes from the switch on of the key is necessary before phase matching adjustment.

II) Normal Operation

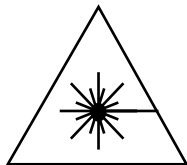
a) General set-up and functions



Do not attempt to modify the pumping power by increasing the charging voltage on the remote control box of the PCC. This voltage has been factory set for optimisation of the laser performances.

In case of flashlamp efficiency decrease, this voltage may need to be adjusted. Contact QUANTEL Service Department in order to be sure of the default's origin.

After the start-up procedure (§ I-a of this procedure or § IV-2 of user manual) has been completed, the output of the laser is controlled only via the remote control box (RC).



b) Continuous emission at the factory-set up rate

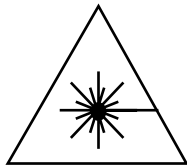
- Continuous emission of the laser pulses is obtained when the **Q-Switch start button** is pressed; its light indicator and the warning LED of the beam shutter of the laser flashes.
- to disable the laser emission, press the **stop button of the Q-Switch**; then its light indicator and the warning LED of the beam shutter of the laser stop flashing.

c) Single pulse emission – manually

- Single pulse emission from the laser is obtained when **single shot button** is pressed; and its light indicator flashes one time.

This mode is mainly used to perform alignments of the user's experimental set-up.

d) Single pulse emission – externally synchronised



- 1) The user is requested to put on the laser protective eyewear at 1064nm, 532nm, 266nm, and 213nm before operating the laser.
- 2) Turn the control key on the front panel of the PCC to the “I” position, the “**power**” and the “**interlock**” indicators on the RC must light up (otherwise check for defaults on the RC screen - see user manual chapter VI).
- 3) Wait about 10-15 min until the water temperature reach the preset value for flashlamp operation.
- 4) Select the following configuration to set the operation mode in **internal** or **external** using the display on RC:
 - a) Put flashlamp in **external** mode, and Q-Switch in **internal** mode (see user manual chapter section IV - 1)
 - b) In case of requiring lower energy than the factory set maximum value, set the Q-Switch delay on the Remote box in the QS Menu to the a higher value while monitoring the energy with a Powermeter. Save this configuration to have the same value after each start up.

Note: The lowest Q-Switch delay value corresponds to the maximum energy. The value is optimised at the factory for each laser and can not be reduced.

- c) Connect your TTL cables to the laser inputs, and follow the procedure below:
- d) Make sure that the TTL signal on the flashlamp input is as described in figure III-5 of the chapter III user manual version 5.

Attention: For single pulse emission the signal length should be $\leq 1\text{msec}$. It is recommended to be between 25-50 microseconds.

The input resistance is about 400 Ohms, and the features of the signal are shown on figure III-5. Rising edges are active edges.

Features of the input signal for flashlamp synchronization

$$\begin{aligned}U_l &< 0.8 \text{ V} \\4 \text{ V} &\leq U_h \leq 15 \text{ V} \\t_w &\geq 25 \mu\text{s} \\t_r &\leq 1 \mu\text{s}\end{aligned}$$

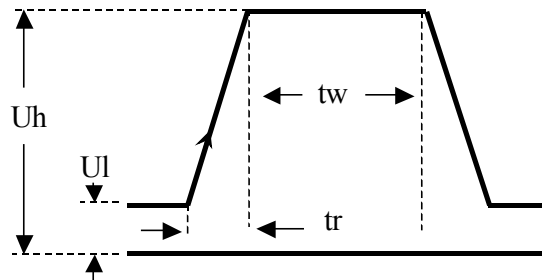


Figure III-5

- 5) Press the **ready button** of the **flashlamp**: this will fire a single discharge in the flashlamp and starts the Simmer current. The ready indicator lights up
- 6) Press the **start button** of the **flashlamp**, its light indicator must light up and the flashlamps operate at the fixed frequency. In external mode the flashlamp will flashes when the external signal is supplied.
- 7) Open the beam shutter of the laser, its warning LED lights up.

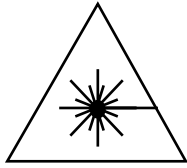


Note: In standard Configuration you have to wait about 8 seconds before the Q-Switch control electronics enable normal operation of the laser. You may wait some minutes if the water temperature of the laser is below the preset value for Q-Switching operation. In this mode the standard specifications as per data sheet do apply.

For immediate single shot operation the inhibition of 8 Seconds has to be deactivated by a skilled technician.

The minimum repetition rate value has to be set to its lowest value by a skilled technician. We recommend to do this in a single configuration (for example configuration 3) and to save the different parameters.

The standard specifications with regards to energy and stability cannot be warranted in this case.



The next step allows the laser to operate and a laser beam will be emitted from the output aperture.

- 8) Press the **start button** to activate the **Q-Switch**, and its light indicator flashes. In external mode the Q-Switch will fire when the external signal is supplied.
- 9) The laser is now waiting for a single external TTL signal.

III) Shutdown Procedure

- to stop the laser emission press the **stop** buttons of the Q-Switch and flashlamp on the RC, their LED indicators must light up.
- Close the beam shutter of the laser, its warning LED goes out.
- Turn the control key on the front panel of the PCC to the “O” position.

IV) Annexe 1 – Abbreviations

| | | |
|------------------|---|--|
| • RC = RB | = | Remote control Box |
| • PCC | = | Power and cooling cabinet |
| • QS | = | Quality Switch (~Pockels Cell) |
| • HG | = | Harmonic Generator |
| • ct | = | Counter total |
| • cu | = | Counter user |
| • qt | = | (Counter) Q-Switch total |
| • qu | = | (Counter) Q-Switch user |
| • FL-QS dly | = | Flashlamp – Q-Switch Delay |
| • CG | = | Cooling Group |
| • F/01 or 02 ... | = | Frequency divided by 1 or 2, etc (~Repetition rate) |

V) Annexe 2 – RC Menu

